

Express Mail Label No.: EL 640 011 113 US

IN THE U.S. PATENT AND TRADEMARK OFFICE

April 3, 2001

Applicant(s) : Toshiaki MOTONAGA et al.  
 For : HALFTONE PHASE SHIFTING PHOTOMASK AND  
 BLANKS FOR HALFTONE PHASE SHIFTING  
 PHOTOMASK THEREFOR AND A METHOD FOR FORMING  
 PATTERN BY USING THE HALFTONE PHASE  
 SHIFTING PHOTOMASK

Atty. Docket No.: OPS Case 529

Assistant Commissioner for Patents  
 Washington, DC 20231

## AMENDMENT BEFORE FIRST OFFICE ACTION

Sir:

Prior to issuance of the first Office Action in the  
 above-identified application, kindly enter the following:

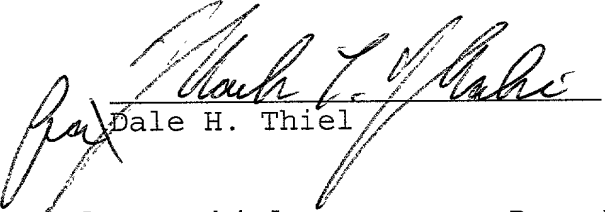
## IN THE SPECIFICATION

Paragraphs 0029, 0030, 0035, 0036 and 0038-0040 are  
 amended as indicated in the attached marked-up copy. Pursuant  
 to 37 CFR §1.121, replacement pages with the amended  
 paragraphs are attached.

## REMARKS

The above amendment is being made to conform the brief  
 descriptions of Figs. 1, 2, 5, 7, 8 and 10-12 to the drawing  
 sheets.

Respectfully submitted,

  
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DHT/jp

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Encl: Marked-up paragraphs 0029, 0030, 0035, 0036  
 and 0038-0040 (2 pages)  
 Replacement paragraphs 0029, 0030, 0035, 0036  
 and 0038-0040 (2 pages)

112.9803

[0029] ~~Fig. 1 is a view~~Figs. 1(a), 1(b), 1(c) and 1(d)  
are views for showing the principle of halftone phase  
shifting lithography.

[0030] ~~Fig. 2 is a view~~Figs. 2(a), 2(b), 2(c) and 2(d)  
are views for showing conventional lithography against Fig.  
1.

[0033] ~~Fig. 5 is a view~~Figs. 5(a) and 5(b) are views for  
showing a state in which phase difference and transmittance  
are changed by applying excimer laser to a halftone phase  
shifting photomask having the halftone phase shifting film  
containing chromium and fluorine.

[0035] ~~Fig. 7 is a view~~Figs. 7(a) and 7(b) are views for  
showing that the spectrum analyzed from reflectance of X-  
rays (of after Fourier transform) is changed by applying  
excimer laser to a halftone phase shifting photomask having  
the halftone phase shifting film containing chromium and  
fluorine, in which Fig. 7(a) shows the spectrum analyzed  
from reflectance of X-rays of before the applying of excimer  
laser to the halftone phase shifting photomask, and Fig.  
7(b) shows the spectrum analyzed from reflectance of X-rays  
of after the applying of excimer laser to the halftone phase  
shifting photomask.

[0036] ~~Fig. 8 is a view~~Figs. 8(a), 8(b), 8(c) 8(d) and  
8(e) are views for illustrating the processes in which  
blanks for halftone phase shifting photomask are produced  
and then a halftone phase shifting photomask of example 1 is  
obtained by processing the blanks for halftone phase  
shifting photomask.

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[0038] ~~Fig. 10 is a view~~Figs. 10(a), 10(b), 10(c) and 10(d) are views for illustrating the process for producing a halftone phase shifting photomask of Example 2.

[0039] ~~Fig. 11 is a view~~Figs. 11(a) and 11(b) are views for showing the phase difference change and the transmittance change due to applying excimer laser to a halftone phase shifting photomask having halftone phase shifting film of Example 1.

[0040] ~~Fig. 12 is a view~~Figs. 12(a) and 12(b) are views for showing the phase difference change and the transmittance change due to applying excimer laser to a halftone phase shifting photomask having halftone phase shifting film of Example 4.

[0029] Figs. 1(a), 1(b), 1(c) and 1(d) are views for showing the principle of halftone phase shifting lithography.

[0030] Figs. 2(a), 2(b), 2(c) and 2(d) are views for showing conventional lithography against Fig. 1.

[0033] Figs. 5(a) and 5(b) are views for showing a state in which phase difference and transmittance are changed by applying excimer laser to a halftone phase shifting photomask having the halftone phase shifting film containing chromium and fluorine.

[0035] Figs. 7(a) and 7(b) are views for showing that the spectrum analyzed from reflectance of X-rays (of after Fourier transform) is changed by applying excimer laser to a halftone phase shifting photomask having the halftone phase shifting film containing chromium and fluorine, in which Fig. 7(a) shows the spectrum analyzed from reflectance of X-rays of before the applying of excimer laser to the halftone phase shifting photomask, and Fig. 7(b) shows the spectrum analyzed from reflectance of X-rays of after the applying of excimer laser to the halftone phase shifting photomask.

[0036] Figs. 8(a), 8(b), 8(c) 8(d) and 8(e) are views for illustrating the processes in which blanks for halftone phase shifting photomask are produced and then a halftone phase shifting photomask of example 1 is obtained by processing the blanks for halftone phase shifting photomask.

[0038] Figs. 10(a), 10(b), 10(c) and 10(d) are views for illustrating the process for producing a halftone phase shifting photomask of Example 2.

[0039] Figs. 11(a) and 11(b) are views for showing the phase difference change and the transmittance change due to applying excimer laser to a halftone phase shifting photomask having halftone phase shifting film of Example 1.

[0040] Figs. 12(a) and 12(b) are views for showing the phase difference change and the transmittance change due to applying excimer laser to a halftone phase shifting photomask having halftone phase shifting film of Example 4.